Mechanical Standard Comments

Based on 1995 California Amendments
May 6, 1998

General Comments:

GM1) General Back Check Comments:

(a) Changes in drawings and specifications, other than changes necessary for correction, made after submission for approval, shall be brought to the attention of the Office in writing or by submission of revised drawings identifying those changes. [Title 24, Part 1, Sec 7-125(d)].
(b) To facilitate the backcheck review, submit a letter accompanying the revised plans and specifications responding to OSHPD's numbered comments and indicating location of responses on plans and/or in specs. Room names descriptive of function shall be shown on the mechanical and plumbing drawings for both demolition and renovation.

GM2) Applicable Codes:

1994 Uniform Building Code with 1995 California Amendments (1995 CBC)
1994 Uniform Mechanical Code with 1995 California Amendments (1995 CMC)
1994 Uniform Plumbing Code with 1995 California Amendments (1995 CPC)
1993 National Electrical Code with 1995 California Amendments (1995 CEC)
NFPA 99, 1993 Edition.

GM3) Unless otherwise noted, all Code citations refer the following:

CMC refers to the 1994 Uniform Mechanical Code with 1995 California Amendments
CPC refers to the 1994 Uniform Plumbing Code with 1995 California Amendments.
CBC refers to the 1994 Uniform Building Code with 1995 California Amendments.
CEC refers to the 1993 National Electrical Code with 1995 California Amendments (1995 California Electrical Code).
NFPA 99 refers to NFPA 99, 1993 Edition.

GM4) Title 24 Statement:

Due to the difficulty of anticipating every unsatisfactory condition that might exist in connection with the existing work where alteration or reconstruction work is proposed, the following clause or one of similar meaning shall be included in all specifications to which the Office gives approval in connection with either reconstruction or alteration work:
"The intent of the drawings and specifications is to reconstruct the hospital building in accordance with the California Building Standards Code, Titles 19 and 24, California Code of Regulations. Should any conditions develop not covered by the contract documents wherein the finished work will not comply with Title 24, California Code of Regulations, a change order, detailing and specifying the required work shall be submitted to and approved by OSHPD before proceeding with the work."

[Title 24, CCR, Part 1, Sec. 7-125(b)(2)]

GM5) Engineer's Signature

All drawings and specifications shall be prepared under the responsible charge, and signed by,

design professionals as prescribed in Part 1, Title 24, CCR, Sec. 7-115.

GM6) Equipment anchorage (less than 400#):

In accordance with CBC 1630A.1, the attachments of the following items need not be detailed on the plans:

1. Equipment weighing less than 400 lbs. supported directly on the floor or roof.
2. Equipment weighing less than 20 lbs. supported by vibration isolators.
3. Equipment weighing less than 20 lbs. suspended from a roof or floor or hung from a wall.

However, such equipment must be supported and anchored to resist the forces prescribed by CBC 1630A.2 and the anchorage shall be approved by the Structural Engineer of Record and OSHPD as a part of field reviews and inspections. The Inspector of Record shall assure that the above requirements are enforced.

GM7) Energy Code Compliance:

Occupancy Category "I" buildings, (hospitals and health facilities licensed under Section 1250 of the California Health and Safety Code), in accordance with provisions of the California Energy Code, CCR Title 24, Part 6, Table 1-A, need to comply with the following:

Section 100: The use of manufactured devices listed in Section 100(g) is limited to only those that have been certified by the manufacturer to meet or exceed minimum specifications or efficiencies adopted by the California Energy Commission.

Section 101: Definitions and Rules of Construction.

Section 118: The use of insulating material of the types listed in Section 118 is limited to only those that have been certified by the manufacturer to comply with the California Quality Standards for Insulating Material, Title 20, Chapter 4, Article 3. All insulating materials shall comply with the flame spread rating and smoke density limitations of the UBC. Installation and R-values shall be in compliance with Section 118.

GM8) Asbestos Alert

The owner/operator and contractor should be aware that in buildings, or portions thereof, constructed prior to 1978 or thereabout, there is a serious possibility that some existing construction materials containing asbestos will be encountered during alterations or remodeling.

Under California Title 8, the owner and contractor both have responsibilities to determine the existence of asbestos containing materials in areas to be altered or remodeled prior to commencement of work and to take appropriate measures to protect personnel and patients. Cal-OSHA has jurisdiction over asbestos related work. The owner or design professional in responsible charge of the work shall contact the Cal-OSHA Consultation Service in his/her area, or in Sacramento (916) 263-2855 for requirements.

HVAC:

CMC Chapter 3 - General Requirements for Air Conditioning and Heating:

M310.1) HVAC Condensate:

(a) Condensate shall be collected and discharged to an approved plumbing fixture or disposal area. Condensate shall not drain over a public way. [CMC 310.1]

(b) Where an HVAC unit is located in an attic or furred space where damage may occur from condensate overflow, a secondary condensate drain shall be provided as prescribed by CMC 310.1.1. The secondary condensate shall discharge in an approved manner at a point which can be readily observed.

(c) Condensate shall be drained by means of indirect waste pipes and shall discharge through an airbreak into an open floor sink or other approved type receptor. [UPC 801.1]

(d) Indirect waste receptors shall be located where they are readily accessible for inspection and cleaning. No indirect waste receptor shall be installed in any toilet room, closet, cupboard, or storeroom, nor in any other portion of a building not in general use by the occupants thereof. [UPC 804.1]

(e) HVAC condensate shall not discharge by direct connection to a lavatory tailpiece. [CPC 807.2 and 807.3]

M329.1.3) Back-up/Standby/Reserve Capacity:

(a) A minimum of two boilers shall be provided. The arrangement of boilers shall be based on the capacity and capability of a boiler or boilers to operate all systems during periods of breakdown or maintenance of any one boiler. [CMC 329.1.2]

(b) Duplex or spare boiler feed pumps, condensate return pumps, fuel oil pumps and heating circulating pumps shall be connected and installed to provide standby service in the event of pump failure. [CMC 329.1.4]

M329.1.5) Two-sources of Heat (Minimum Requirement):

At least two sources of heat (e.g. two pieces of equipment) shall be provided for supplying essential services such as sterilizers, hot water for dishwashing, and domestic hot water for minimum patient service, such as handwashing and baths. [CMC 329.1.5]

M331) Essential Mechanical Provisions:

During periods of power outages, emergency electrical power shall be provided for the following equipment per CMC Section 331:

(a) All heating equipment necessary to maintain a minimum temperature of 60^{o}F in areas which are not specified in CMC Table 330.

(b) All heating and humidification equipment necessary to maintain temperatures and humidities for sensitive areas as specified in CMC Table 330.

(c) All supply, return, and exhaust fans required to maintain the positive and negative air balances as required in CMC Table 4-A.

CMC Table 4-A:

Air Balances:

M4A-1) Provide positive air balance per CMC Table 4-A.

M4A-2) Provide negative air balance per CMC Table 4-A.

M4A-3) Provide equal air balance per CMC Table 4-A.

Air Changes:

M4A-4) Provide not less than 4 air changes total and not less than 2 air changes outdoor air per CMC Table 4-A.

M4A-6) Provide not less than 6 air changes total and not less than 2 air changes outdoor air per CMC Table 4-A.

Other Table 4-A Comments:

M4A-7) Corridor ventilation:

Provide equal air balance and not less than 4 air changes total, and not less than 2 air changes outdoor air in corridors. [CMC Table 4-A]

M4A-8) Corridor air balance:

Corridors shall have equal air balance when cross-corridor doors are closed. [CMC Table 4-A]

M4A-9) Minimum Outdoor Air Requirements:

Specify minimum outdoor setting for air handler(s). Sufficient outdoor air shall be provided to assure that minimum outdoor air change requirements of CMC Table 4-A are met or exceeded for each room.

CMC Chapter 4 - Ventilation:

M405-1) Air Handling Systems:

Air Systems Equipment shall comply with the following:

(a) Continuous fan operation per CMC 405.1.1.

(b) Fans shall be on emergency power per CMC 331.4.

(c) Outdoor air intakes shall be located away from exhaust outlets, plumbing vents, combustion equipment and other sources of contamination as required by CMC 405.2 and CMC 317.6.

M405-2) Exhaust systems:

Exhaust fans shall be located at the discharge end of the system per CMC 405.1.2.

M405-3) Corridor Plenums:

Corridors shall not be used to supply air to or exhaust air from any room except to ventilate small rooms, 30 sq. ft. or less, which are mechanically exhausted, such as bathrooms, toilet room and janitors' closets opening directly on corridors. [CMC 405.4.1.3]

M405-4) Ceiling Plenums:

No space above a ceiling may be utilized as an outside air, supply-air or exhaust-air or return-air plenum. [CMC 405.4.1.4]

M405-5) Air Balance and Volume Control:

Where the variation in static pressure drop across filters is a significant portion of the total pressure drop, static pressure or pressure differential controls or constant volume devices may be required to ensure the maintenance of air balance relationships shown in CMC Table 4-A regardless of filter loading. [CMC 405.3.2]

M406.0) Filters:

Filtration shall comply with CMC 406:

(a) Where two filter banks are required, Filter Bank No.1 shall be not less than 25% efficient, and shall be located upstream of the air conditioning equipment, and Filter Bank No.2 shall be not less than 90% efficient and shall be located downstream of the supply fan and all cooling and humidification equipment [CMC 406.2.1].

(1) Where only one filter bank is required, the recommended location is upstream of the air conditioning equipment [CMC 406.2.4 and 406.2.5].

(b) A filter gage shall be installed across each filter bank serving the central air handling systems. The gage shall be red-lined or a filter alarm light shall be installed to signal when the recommended maximum static pressure drop has been reached [CMC 406.1.1].

M411.1) Odorous Rooms:

Rooms in areas where excessive heat or moisture is generated, where objectionable odors or dust are present, or where flammable or toxic gases may accumulate, which are used by health facility personnel or patients, shall be provided with not less than 10 air changes per hour exhaust. [CMC 411.1]

M412) Negative Pressure Isolation Rooms:

Refer to the attached "Negative Pressure Isolation Room Design Checklist" for requirements.

CMC Chapter 6 Duct Systems:

M603) Flexible Ducts:

Flexible ducts shall conform to the following requirements:

(a) Flexible ducts shall consist of an exterior reinforced laminated vapor barrier, insulation in

accordance with CMC Section 604, encapsulated spring steel wire helix and impervious, smooth, non-perforated interior liner.

(b) Installation of flexible ducts shall be in accordance with UMC Standard 6-5. Installation shall minimize sharp radius turns or offsets. The maximum length will be seven feet and can be used at the terminal ends only, except that flexible ducts properly installed may be used to cross seismic joints without offsets. [CMC 603.5]

M608) Automatic Smoke Shut-Off

Air handlers providing in excess of 2000 CFM shall be equipped with automatic fan shut off per CMC 608.

CMC Appendix B, Chapter 12, Steam and Water Piping:

M1201-1) Provisions for Pipe Movement:

(a) Piping shall be installed so that piping, connections and equipment shall not be subjected to excessive strains or stresses and provisions shall be made for pipe movement due to seismic events, thermal affects, shrinkage, and settlement. [CMC Appendix B, Ch. 12, Sections 1201.1.7.5 and 1201.1.6.3]

(b) Joints and offsets for pipe movement shall use normally accepted methods in accordance with manufacturer's recommendations and related sections of the CMC. [CMC Appendix B, Ch. 12, Sec. 1206]

Plumbing:

P311.9) Overhead Piping:

(a) Drainage and rainwater piping over operating and delivery rooms, recovery rooms, nurseries, intensive care units, food prep centers, food-serving facilities, food storage areas, and other critical areas shall be kept to a minimum and shall not be exposed. Special precautions shall be taken to protect these areas from possible leakage from necessary overhead piping systems. [CPC 311.9] (Acceptable special precautions are described in CAN 5-311.9)

(b) Piping over electrical rooms is regulated by Section 384-4 of the 1995 California Electrical Code.

P314.0) Provisions for Pipe Movement:

Piping shall be installed so that it shall not be subjected to excessive strains or stresses and provisions shall be made for pipe movement due to seismic events, thermal affects, shrinkage, and settlement. [CPC 314.5, 314.8, 609.1]

P611.1) Domestic Hot Water System - Anti-Scald Features:

Section 611.0 of the 1995 California Plumbing Code shall be implemented to prevent patient

scalding. The domestic hot water system shall have the following anti-scald features:
(a) Hot water supplied to patient areas shall be between 105 and 120°F [CPC 611.5].

(b) Provide a temperature sensor in the hot water supply which will activate an alarm light at the Nurses' Station when temperature exceeds 125°F. [CPC 611.5].

(c) The hot water supply to each patient shower and bathtub shall be controlled against sudden temperature changes by thermostatic or pressure balance type valves [CPC 611.6].

(d) The hot water distribution system shall provide hot water at the required temperature at all times. [CPC 611.7]

P612.1) Dialysis Water:

(a) How will the delivery of dialysis quality water [as defined by CPC Section 612.7] to the patient be assured? Consider the effect of changing concentrations of chloramines and other domestic water impurities.

(b)Provide the following information regarding the dialysis system:

(1) Indicate the point of injection of the sterilizing agent into the reverse osmosis solution and the concentrate solution supply systems. A solenoid valve linked to the Nurses Station is recommended in order to prevent sterilization when one or more stations are in operation. [CPC 612.5 and 612.6]

(2) Describe the procedure which insures that the reverse osmosis and concentrate supply systems may safely be placed into the sterilizing mode. [CPC 612.5 and 612.6]

(3) Indicate the controls provided to place the R.O. and concentrate supply systems into the sterilizing mode, the location of the controls, and the provisions that would prevent the supply systems from being improperly placed into the sterilizing mode (e.g., keylock systems at Nurses Station and equipment room, etc.). [CPC 612.5 and 612.6]

(4) What is the duration of the system flushing mode after sterilizing has been completed? [CPC 612.7]

(5) After flushing, how are the reverse osmosis and concentrate systems determined to be safe for placement into the dialysis mode? [CPC 612.7]

(6) What instrumentation, if any, is provided to confirm that the systems can be safely placed into the dialysis mode? [CPC 612.5 and 612.6]

(7) Indicate the alarms that are provided which would indicate improper reverse osmosis or concentrate solution velocity and improper placement of the system into the sterilizing mode. [CPC 612.6]

(8) Are sterilizing agent fumes vented into the treatment area? If this is the case, how are they properly vented? [CMC 411.1]

(9) Drainage of individual stations shall be by indirect drain lines. [CPC 806]

P612.2 Dialysis Water Distribution Systems:

(a) Dialysis water feedlines shall be PVC, glass or stainless steel and sized to provide a minimum velocity of 1.5 fps. The piping shall be a single-loop system with or without recirculation. Branches to dialysis machines shall be 1/4 inch inside dimension and take off

from the bottom of the main feedline. [CPC 612.1]

(b) All piping for multi-station or central dialysis units shall be rigid where possible. All piping and tubing shall be in a neat arrangement. The placement of piping or tubing on the floor is not permitted. [CPC 612.2]

(c) All valves shall be in accessible locations. [CPC 612.3]

(d) Piping and valves shall be identified according to their function. [CPC 612.4]

P1011.1 Sewage Treatment - Administrative Authority:

The administrative authority is the official, board, department, or agency authorized to administer and enforce the sewage treatment system in the area or location of the health facility. [CPC 1011.1]

P1011.10 Grease Traps:

Grease traps shall not be installed in food preparation areas of kitchens. [CPC 1011.10]

P1012.1 Grease Interceptors:

(a) Grease interceptors shall be sized in accordance with UPC Appendix H criteria unless other criteria are prescribed by local authorities. [UPC 1012.0]

(b) Grease interceptors shall be installed outside of the kitchen area in a location affording ease of maintenance and servicing. [CPC 1012.1]

Medical Gases:

P99.4-3) Medical Air Compressors:

(a) Is medical air supplied by two or more, oil-free compressors per NFPA 99, para 4-3.1.9.1, and 4-3.1.9.3?

(b) Does the intake to the medical air compressors comply with NFPA 99, para 4-3.1.9.2?

(c) Are the medical air compressors on emergency power per NFPA 99, 4-3.1.9.4(d)?

(d) Do the medical air compressors deliver CGA Grade D air and are carbon monoxide and dew point alarms provided? [NFPA 99, 4-3.1.9.7 and 4-3.1.9.8]

(e) Medical air shall be used only for patient respiratory purposes and shall not be used for utility applications such as maintenance or hospital support (including door openers) [NFPA 99, para. 4-3.1.9.1]

P99.4-4.1) Medical Gas Master Alarms:

To ensure continuous responsible observation, master alarm panels shall be located in two

separate warning locations, wired in parallel to a single sensor for each condition. Audible and noncancellable visual signals shall be installed in the office or principal working area of the individual responsible for maintenance of the medical gas system, and, to ensure continuous surveillance, at the telephone switchboard, the security office, or at another suitable location. [NFPA 99, 4-4.1.1.2(a)]

P99.4-4.2) Medical Gas Piping:

(a) Medical gas piping shall be hard-drawn seamless medical gas tubing, Type K or L, ASTM B819, and bear one of the following markings: OXY, MED, OXY/MED, ACR/OXY or ACR/MED. [NFPA 99, para. 4-4.1.2.1(c)]
Exception: For systems operated at pressures between 200 and 300 psig, ASTM B819, Type K copper shall be used.

(b) In lieu of the above, medical vacuum piping may be seamless Type L, M, or ACR (ASTM B280) copper tube or other corrosion resistant metallic tube such as stainless steel or galvanized steel. However, if vacuum tube is installed simultaneously with other medical gas tubing, it shall be labeled or otherwise identified prior to installation in order to preclude inadvertent inclusion into a positive pressure medical gas system. [NFPA 99, para. 4-9.1.1.1(a)]

P99.4-8) Medical Vacuum:

(a) Are there at least two vacuum pumps per NFPA 99, 4-8.1.1(a)?
(b) Does the vacuum exhaust location comply with NFPA 99, 4-8.1.1(i)?
(c) Are the medical vacuum pumps on emergency power per NFPA 99, para. 4-8.1.1(d)?
(d) Medical vacuum shall not be used for vacuum steam condensate return or other non-medical or non-surgical applications. [NFPA 99, para. 4-11.2.1.6].

P99.4G) Medical Gas Systems - General Comment:

See attached "Medical Gas System (Type I) Compliance Checklist" for references to pertinent Code requirements and NFPA 99 section listings.

Fire & Life Safety:

Mf1) Drawing Requirements - Room Function:

Identify on the plans the function, occupancy or usage of each room, area or space. Floor plans for addition or alteration projects shall be accompanied by floor plans of the existing buildings showing existing space usages. [CCR Title 24, Part 1, Sec. 7-121(b)]

Mf2) Drawing Requirements - Rated Walls:

Identify locations of all occupancy separation walls, fire and/or smoke walls on plans. [CCR Title 24, Part 1, Sec. 7-125(c)]

Mf3) Fire/Smoke Dampers:

Provide fire and smoke dampers at penetrations of fire rated corridor walls. [CBC 713.10 &

11]

Mf4) Fire/Smoke Dampers:

Provide fire and smoke dampers at penetrations of area or occupancy separation walls. [CBC 713.10 & 11]

Mf5) Fire Damper and/or Smoke Damper Detail:

Include the following statement, or one of similar content:
"Damper detail is for reference only. Dampers shall be labeled by an approved agency and installed strictly per manufacturer's printed instructions. Manufacturer's installation instructions shall be made available to the inspecting authorities." [CBC 713.2, CMC 605]

Mf6) Duct penetrations:

Duct penetrations of walls, floors, shafts or ceiling assemblies requiring protected openings shall be protected with approved fire dampers complying with recognized Standards in UMC Chapter 16, Part III, shall be installed in accordance with approved manufacturer's installation instructions when required by Chapter 7 of the CBC and shall be readily accessible for servicing. [CBC 709.6, 710.2, 713.10, 713.11, CMC 605.5]

Mf7) Pipe and conduit penetrations:

Penetrations of pipes, conduits, etc., in walls, floors or ceiling assemblies requiring protected openings shall be fire stopped. Fire stop material shall be a tested assembly as prescribed in UBC Standard 7-1 and as approved by the State Fire Marshal. [CBC 709.6, 710.2]

Mf8) Automatic Fire Sprinklers:

The automatic sprinkler system shall conform to the requirements of the 1994 edition of NFPA Standard #13.

Installation of the sprinkler system shall not be started until complete plans and specifications (including water supply information and type of existing sprinkler system, if any) have been approved by OSHPD.

At various stages and upon completion, the system must be tested in the presence of the enforcing agency.